REMARKS

ON

RELAPSING FEVER.

BY

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In the *Glasgow Medical Journal* for November, 1869, Drs Russell and Joseph Coats, in anticipation of the occurrence of an epidemic of relapsing fever in this city, contributed an abstract from the German of "Recent Observations on Relapsing Fever." As that fever has now been prevailing amongst us for many months in a truly epidemic manner, it seems but an appropriate sequel to this abstract that some account should be given of the course, symptoms, complications, sequelæ, and other peculiarities of the disease, as actually observed by us in the wards of the City of Glasgow Fever Hospital.

In the following paper I propose to give an analysis of 352 cases of relapsing fever, admitted into the Fever Hospital, between the 16th March and 20th October, 1870. My reason for limiting the analysis to these 352 cases is, that up till the 20th October the progress and course of each case had been carefully noted daily, morning and evening, observations being regularly recorded in the hospital journals. Subsequently, however, it became necessary, from the greatly increased number of patients, to diminish as much as possible the labour and time required in the keeping of such records, and to content ourselves with merely noting what was absolutely requisite to an accurate knowledge of the progress of the case. While, however, the statistical tables which have been compiled, and the remarks and inferences founded thereon, refer solely

to the eases admitted between the dates mentioned, I shall not fail to state anything of speeial interest whieh further and more extensive experienee ean furnish. Every ease, I may add, in whieh no seeond attaek or relapse oeeurred, has been exeluded from the 352, exeept those in whieh not only were all the usual symptoms of relapsing fever present, but where, in addition, there was the most distinet history of previous assoeiation with eharaeteristie eases of that disease at the same time in the hospital.

Before entering on the eonsideration of the eourse, symptoms, &e., there are some general features and peeuliarities of this interesting disease well worthy of notiee; sueh as the eireumstanees eonneeted with its first appearanee in the eity; its relation to destitution or famine; its eommunicability from one person to another, &e.

The first eases of relapsing fever brought under the notiee of the Sanitary Department were admitted to this hospital, eertified as typhus fever, on the 16th Mareh, 1870. Dr Russell, with the distriet inspeetor, shortly thereafter visited the loeality in whieh these eases had oeeurred, and made minute inquiries as to the origin of the disease. The result of the investigation Dr Russell has stated in the annual report of the hospital for 1870, and as this is of eonsiderable interest and importanee, I eannot do better than extraet from that pamphlet the following remarks:—"The appearance and soeial eondition of the first vietims of relapsing fever in Glasgow, were quite in aeeordanee with universal experienee. On 16th Mareh, 1870, the inmates, four in number, (a man, aged 50, and three sons,) of a room at 7 Muirhead Street, Gorbals, were admitted to this hospital, suffering from a fever whieh soon deelared itself to be relapsing. On the 28th a boy was admitted from the same number, with the same disease. These were the first eases seen in hospital, in Glasgow. There is every probability that the first family (the MaeG.'s), were the very first in the eity. They were miserably elad, hollow eheeked, and wretehed in bodily eondition. The MaeG.'s house was shut up, all its inmates being in hospital. That from whieh the boy John S. was

removed, I found occupied by his mother, her infant, and a younger son. The woman was so insufficiently clad that she held about her person, during my visit, what seemed to be a bedcover. There was not 'a stick of furniture' in the house. The only bedding was a bag of straw, on which the infant was sleeping, covered with a ragged towel. The mother was gaunt, sallow, and dirty. The husband, I was informed, is a drunkard. Minute inquiry was made into the origin of the fever, and we got at once an account of a man who walked from Bathgate and was allowed to sleep in MacG.'s house, where he became ill, and lay during his illness, which was marked by great thirst and perspirations. He had been ill in Bathgate, and came primarily from Edinburgh. It is therefore probable that this man caught relapsing fever in Edinburgh, had his first attack in Bathgate, walked in the non-febrile interval to Glasgow, had the relapse in the house of these MacG.'s, and so planted the disease there. The family of J. S. was intimate with that of the MacG.'s, and no doubt were infected by the intercourse of the boys of the two families."

During the months of March, April, May, and June, sporadic cases continued to occur throughout the city, more especially, however, in the Central District. In July there was a notable increase in the number of cases, and by August relapsing fever may be said to have become epidemic in the city. The acme of the epidemic appears to have been reached on the 13th of December, when 1199 cases were reported by the Sanitary Department; since that time it has steadily, though slowly, declined. Should the decrease be a permanent one, Glasgow will have much reason to be congratulated on the mildness of the visitation. Contrasted with London or Liverpool, every allowance being of course made for disparity in population, the number of cases has been greatly less. When compared, too, with previous epidemics in this city, the contrast is even more striking. For example, in 1843 no less than 32,000 cases occurred in the space of eight months. No doubt the ample hospital accommodation soon provided, and the rigorous measures

adopted by the Sanitary Department have greatly contributed to this result. At the same time it must be admitted that poverty and destitution, the conditions most favourable to its spread, have of late been less extensively prevalent in the city.

As before indicated, the appearance and social condition of the first victims of relapsing fever in Glasgow were quite in accordance with universal experience. I have now to remark that in the subsequent progress of the disease former experience was also amply supported and corroborated. Throughout the entire epidemic the same phenomena were generally to be observed; indeed, in the great majority of the cases the evidences of poverty and destitution were but too plainly discernible. Not a few of them were totally houseless, without trade or employment of any kind—thorough Pariahs, in fact. Their miserable circumstances were also but too clearly apparent in the wretched attire and unhealthy aspect of the friends who came to inquire after them. Even among the nurses it became, after a time, quite a trite remark that hardly any respectable person came to ask after the relapsing patients. A number of the patients were undoubtedly both in good circumstances and excellent health, but this is just what might be expected, considering the highly infectious nature of the disease. On this topic I will only further remark that a medical gentleman who was familiar with relapsing fever in the previous epidemics, and is now engaged in extensive practice in the city, chiefly, however, among the better classes, recently told me that he had not as yet met with a single case of relapsing fever, although he had been watching for it intently.

Relapsing fever is in an eminent degree communicable from one person to another, in its own habitat. In 295 cases out of the 352, or in 83 per cent., there was the most distinct history of previous association with cases of that disease. That proportion is certainly much greater than we meet with in typhus. When once introduced into a house it generally attacked the whole family. From but few localities did we

receive only one case. As exemplifying more fully its communicability, I may state that to the man lodging with the MacG.'s, in 7 Muirhead Street, the origin of 13 cases admitted could be traced; to another source of infection, 10 cases; while to a third centre 15 cases could be ascribed. While thus highly infectious where the surroundings are favourable, under the improved sanitary condition of a hospital ward relapsing fever is, as compared with typhus, easily disabled. Thus, out of 80 nurses and other servants exposed, only 16 were attacked. In a paper read before the Medico-Chirurgical Society of Edinburgh by Dr Claud Muirhead, the opinion is somewhat strongly advanced that relapsing fever is for the most part communicated by contagion. Now, any attempt to draw such a fine line of demarcation between contagion and infection is necessarily one of the most difficult problems in the causation of fever. They are so closely interwoven that it is well-nigh impossible to separate them; indeed, infecting influences become intensified *pari passu* with the nearness of the source of infection. Assuredly the examples cited by Dr M., as illustrative of his belief, do not in any respect warrant such a conclusion. One of them is to the following effect:—"Another family of six were admitted from Canonmills, and the father told me that he took the fever from his little son, who was crying bitterly with the pain in his head, and entreated his father to take him into his bed, as he thought he should then be well; the father complied, and that very morning he was seized with headache and shivering." Here Dr M. totally ignores a conclusion at which he had arrived but a short time before, viz., that the period of incubation of the fever extends from five to ten days. The other examples are as manifestly inconclusive as the preceding,

The fact seems worthy of note, that, with the appearance and increase of relapsing fever, there was a corresponding, steady, and permanent decrease in the number of typhus cases. A similar observation was also made in London and Liverpool. Coincident, too, with the decline of relapsing fever in the city, small-pox, as in London and Liverpool,

made its appearance, but as yet there does not seem to be any prospect of its attaining here the prevalence for which these two cities are at present so notorious.

In the annual report of the hospital, published in July, 1870, Dr Russell remarks that in no case as yet have relapsing and typhus fever been associated, or in any way intermingled. Since that time, however, one very remarkable instance of such a nature has been met with. On the 14th of November, 1870, John B., his wife, and three children, were admitted to the hospital affected with relapsing fever. The children were seized with the second attack about the ordinary time. The wife, who on admission seemed well, and whose illness had partaken more of the character of general malaise than of an acute fever, did not relapse. John B., when admitted, had been ill six days. The crisis, accompanied by the usual sweating, occurred on the 7th day. During the interval nothing of special import was observed. On the 13th day of his illness, or the 21st Nov., he again became febrile. This recurrence of the fever was of course at once regarded as the onset of the second attack, but after a day or two it became manifest that this second seizure was considerably out of the beaten track. The eyes were greatly suffused, the aspect dull and heavy, the expression stolid and indifferent, and the tongue dry and brown. There was also considerable delirium. On the 27th a distinct typhus rash was detected, which subsequently became very copious, and remained pronounced till after the attainment of the crisis, when it slowly disappeared. The fever continued to pursue in every way the customary typhus course; in particular, the thermometric observations which were regularly taken fully confirmed the other proofs of its typhus character. The crisis occurred in the usual gradual manner on the 5th of December, or 15th day of the second illness. Unfortunately, about a week after convalescence had set in, he was seized with pleuro-pneumonia, from which his recovery was very tedious and protracted. Minute inquiry failed to elicit any history of previous association with typhus, as well as with relapsing fever; but that there

really had been also a foeus of typhus fever somewhere existing was strongly indicated when, on the 16th Deeember, a nephew of John B.'s, aged 16, residing in the same "land," was admitted to the hospital, suffering from a severe attaek of typhus of about twelve days' duration.

Of the 352 cases two of them had been before in the hospital with well marked enterie fever. One male patient, too, after he had been for a considerable time eonvalescent, in some way eontraeted typhus. The attaek was, however, a mild one.

In proceeding now to consider the eourse, symptoms, and other peeuliarities of relapsing fever, I will, in the first plaee, give a brief general description of the disease, and, afterwards, in conneetion with the facts contained in the statistieal tables, take up more minutely in detail some of its most prominent charaeteristies.

The onset of relapsing fever is, as a rule, very sudden and abrupt, and the symptoms are very violent and severe. In this respeet it bears more resemblance to the premonitory symptoms of small-pox than to any of the other specific fevers of this country. A person previously in the full enjoyment of health suddenly experienees a severe rigor, aeeompanied or followed, it may be, by intense headaehe, backaehe, siekness, and vomiting, with a sense of great prostration. Of the 352 cases upwards of 250, or 71 per cent., were abruptly ushered in with shivering, headache, &c. In some eases the premonitory symptoms present themselves very gradually, and consist chiefly of a feeling of general malaise. In the seizure of some of our nurses the invasion was indeed very insidious and protraeted; one in partieular repeatedly complained at different times of anorexia, sickness, vomiting, headaehe, and general soreness. There was, however, no elevation of temperature. Finally, one of these formerly abortive invasions fully developed itself into a thorough and severe attack of relapsing fever. Regarding the mode of invasion, I shall have more to say when considering the phenomena attending the onset of the second attack. During the existence of the severe premonitory symptoms there

is generally considerable constitutional disturbance. A few hours after their first appearance I have found the pulse as high as 120, and the temperature upwards of 103°. Usually, after the febrile process has been as it were once fairly set agoing, there is a slight temporary abatement in its intensity. The symptoms and signs afterwards observed are —rapid, often full, bounding and thrilling pulse; pungent heat of skin, but in some cases at times considerable perspiration; extreme thirst, flushing of face, or highly anæmic, and sallow aspect; clear conjunctivæ, eyes very rarely suffused; tongue coated with a milky white, slight gray or yellowish wash-leather-like fur, often marked prominence of the papillæ, edges and tip usually pretty clean, and the entire tongue remaining moist and pliant throughout; sordes very seldom met with. Sometimes there is extremely severe and persistent headache, but the mental powers are generally in no way impaired. Hearing is perfect. The existence of delirium is quite exceptional. Nausea, with severe and persistent retching or vomiting frequently occurs; in some cases, however, the digestive functions are but little interfered with, food being eagerly asked for, and partaken of with considerable relish, even at the height of the fever. Bowels generally remain constipated throughout. Pains are often experienced in the epigastrium, in the right hypochondrium, and in the splenic region, while severe muscular and arthritic pains, greatly aggravated by the least movement, still further intensify the sufferings of the patient. Moreover, there is often present, to a marked degree, that peculiar and indescribable sense of oppression which is frequently felt and witnessed in fever. The countenance consequently is often expressive of extreme anxiety and discomfort. The breathing is frequently greatly accelerated and disturbed, sometimes literally panting. This is, however, in the majority of cases, manifestly secondary to the great sufferings and self-consciousness of the patient, and not the result of any primary respiratory derangement. Sleeplessness and restlessness are marked phenomena. In a good many cases

there is a kind of bronzing of the skin; while in a considerable proportion decided jaundice, or a disposition thereto, is observed. In only a very few cases is a rash to be detected; but even when present, from its want of uniformity, and general irregularity in duration, &c., it can hardly be regarded as in any way an essential phenomenon of the fever. Epistaxis or menorrhagia, at times very profuse, occasionally occurs. The symptoms enumerated above continue to rage with varying, or increasing intensity, till about the 5th, 6th, 7th, or 8th day—about 6·86 days on an average—when a very remarkable change ensues just as suddenly and abruptly as the onset of the disease. In a number of cases this change is preceded by a severe rigor. Within a few hours the pulse falls 30, 40, or 50 beats, and the temperature dips down many degrees. Everything, indeed, appears to alter: instead of the extreme discomfort, pain, and irritability, formerly experienced and displayed, there is now ease, placidity, and languor, with a sense of great exhaustion. Accompanying this striking change there is very copious perspiration, often, in fact, so very profuse that the patient may truly be said to be bathed in sweat, the sheets, blankets, and even the mattress, being thoroughly soaked, indeed almost dripping. In a number of cases, however, there is a most powerful depressing constitutional effect produced at the crisis. The pulse becomes very shaky and feeble, or highly irregular, or again too rapid and small to be counted, and only perceptible as a mere flutter; the countenance is waxy, or ghastly sallow, indeed, deathly pale, not a vestige of redness being visible, even the lips, tongue, soft palate, and fauces are at times almost totally bloodless. The eyes are much retracted; the features greatly shrunken and pinched, and the voice feeble, husky, or puerile, the patient only speaking in the merest whisper. There is general coldness and clamminess of the surface; the breathing is slow and sighing, and there is often severe retching and vomiting, with at times obstinate hiccough. Occasionally syncope occurs. In one case there was present for a short time a deep lobster redness on the hands, arms,

and face, which, taken along with the other appearances, reminded one strongly of the choleraic state. All the while the patient's intelligence is perfect.

A period of apyrexia now intervenes. The pulse and temperature, both of which had at the crisis become considerably subnormal, again gradually reascend to the normal. The tongue cleans, the appetite returns, and strength is regained; in short, everything betokens complete and permanent convalescence. Sometimes the patient is tormented for a day or two with muscular and arthritic pains. The prominent feature, however, of the apyretic period is the marked and intense anæmia which is almost invariably produced. The countenance, which during the fever had been often greatly flushed, is now sallow and pale in the extreme. Altogether the patient presents a really blighted and washed-out appearance. The anæmia, I may here remark, persists for a long time; even on dismissal, after a residence in hospital of from six to eight weeks the pale, sallow, and withered aspect of the relapsing convalescent is in striking contrast to the healthy hue generally met with after typhus.

Close upon the 13th, 14th, or 15th day, on an average between the 14th and 15th day, a relapse occurs with almost as much abruptness as the first attack. Occasionally, however, the invasion is somewhat insidious and gradual. As the symptoms displayed in the second attack are, in most cases, simply a repetition of those described as characterising the first, they need not be again enumerated. The fever is perhaps a little less intense; it is certainly less prolonged, generally terminating, on an average, by the 5th day. The crisis is accomplished in the same remarkable and sudden manner, and is attended by the same extremely profuse sweating. Sometimes after another apyretic interval there is a third attack, or second relapse. Even a fourth and fifth attack have been observed by some writers. After the cessation of the second illness the muscular and arthritic pains are much more severe and prolonged. The anæmic and blighting effect is even more obtrusively present,

while in a large proportion of the cases there is very considerable œdema of the lower extremities, and in some there is also puffiness of the hands, arms, and face. This œdema not unfrequently exists for weeks after convalescence has fairly set in.

Before proceeding further, there is still one subject which, from its interest and importance, deserves special consideration, namely, the nature of the onset of the second attack, or the first manifestations evinced of the commencement of the pyrexial process. In no other disease except intermittent fever is such an excellent opportunity afforded for studying the very earliest effects of the fever poison, for here we know and anticipate that the poison is present, though quiescent, and that at a certain time it will, so to speak, rekindle and burn with all its former energy and vigour. In a good many cases I took thermometric observations every four hours, in order that any rise in the temperature might be at once detected. The result of these investigations may be shortly stated as follows:—

1st. That in all of them distinct evidences of the renewed activity of the poison were observed for some time before the least rise in either the temperature or the pulse had occurred. The nature of these evidences varied, but they are comprised in the following:—Flushing of face, or increased dulness of countenance, eyes glistening, tongue—which previously had been clean—becoming furred, papillæ being again prominent, headache, general pains, anorexia, and feeling of malaise. In one case slight shivering was experienced. In all the other cases when shivering took place there was found elevation of temperature. The duration of this period of non-pyrexial activity was generally from about twelve to twenty-four hours, sometimes about forty-eight hours, and occasionally even longer than that. In one case it actually existed for five days. On the 14th day of the illness the patient was noted as still well, the tongue being perfectly clean. On the 15th the tongue was coated in the centre with a uniform moist yellow fur. On the 16th the tongue was still more furred. On the 17th the aspect was

dull, the face flushed, and the tongue quite dry and brown in the centre—the edges being covered with a moist white fur. On the 18th the condition was much as above. On the evening of the 19th still the same appearances, but the pulse, although only 72, was irritable. During the afternoon of the 20th day the temperature rapidly rose to 104°, the pulse remaining at 84; and on the evening of that day the patient experienced a severe rigor, followed by backache and headache, after which there was a still greater elevation in the temperature, and a decided rise in the pulse rate. Up till the time of the shivering he constantly affirmed that he felt in all respects well.

2nd. In the great majority of the cases the temperature was found to be elevated some time before there was any increase in the rate of the pulse. Generally the elevation of the temperature preceded the rise in the pulse rate by several hours. Sometimes, however, two days, and occasionally even four days elapsed before any change in the pulse was noted. In one case four days after the temperature began to rise, and had at different times been as high as 104°, the pulse still remained at 78. The patient then experienced a rigor, followed by headache and backache, after which the pulse continued steadily to rise, finally attaining a maximum of 132. In this case, too, as in the one referred to above, the patient, before the shivering occurred, admitted no subjective complaint whatever, except that somehow he felt rather less cheerful.

3rd. In a number of the cases, as has been to a certain extent already indicated in the cases alluded to above, both the temperature and the pulse rose considerably before any complaint was made or admitted by the patient.

In the *Glasgow Medical Journal* for November, 1870, a short extract was given from one of the exchange German journals, of a paper by Dr Naunyn, entitled, "Contributions to the Science of Fever." Among other conclusions, Dr N. proves by careful experiments on dogs, that after the introduction of putrid fluid into the veins, or subcutaneously, the

temperature does not rise for a spaee of one or two hours; but in all the cases during this non-febrile period of lateney there was an increased exeretion of urea. Although in my eases the amount of urea excreted was not determined, it is still very interesting to find that the other evidenees above enumerated of non-pyrexial aetivity of the poison so thoroughly agree with the nature and essence of Dr Naunyn's conelusion. They at any rate clearly prove that some of the physiological effects of relapsing poison are exhibited before any rise in the temperature takes place.

I eome now to eonsider somewhat more minutely in detail a few of the prominent eharacteristies and peeuliarities of relapsing fever. In order to present at a glance an estimate of the comparative duration of the disease during the first attaçk, the interval, and the second attack, and of the frequency with which such important symptoms and peeuliarities as rash, delirium, jaundice, muscular pains, the occurrence of a third attack, &c., are observed, I have compiled two statistical tables, from the facts displayed by the 352 eases which form the basis of the present paper. One table includes 162 male patients, and the other 190 female patients, admitted within the period mentioned. In the compilation of these tables I was greatly assisted by my friend Dr J. G. Lyon. To render the tables as concise as possible, and yet at the same time show any comparative difference which might be the result of age, I have arranged the eases according to age into deeennial divisions. As the columns for the duration of the disease merely, of eourse, indicate the average duration, I have annexed two little tables so as to show the longest and shortest duration of the disease during the first attaek, the interval, and the seeond attack, at the respective deeennial periods of life.

MALES.

Age.	1st Attack. Longest.	1st Attack. Shortest.	Interval. Longest.	Interval. Shortest.	2nd Attack. Longest.	2nd Attack. Shortest.
0 — 9	9	4	9	5	7	2
10 — 19	11	5	12	4	7	2
20 — 29	9	5	11	6	6	3
30 — 39	9	4	10	6	7	3
40 — 49	9	6	10	7	7	4
50 — 59	9	6	9	9	9	4
60 —	9	6	8	8	7	4

FEMALES.

Age.	1st Attack. Longest.	1st Attack. Shortest.	Interval. Longest.	Interval. Shortest.	2nd Attack. Longest.	2nd Attack. Shortest.
0 — 9	9	4	10	4	7	2
10 — 19	9	3	11	6	7	3
20 — 29	10	5	11	5	6	3
30 — 39	12	5	11	4	8	3
40 — 49	8	5	10	6	9	4
50 — 59	7	7	10	10	9	4
60 —	7	7	10	10	7	4

Duration.—Between tables No. 1 and 2 (see end of paper) there is hardly any difference in the duration of the disease, so that sex seems to exercise little influence in that respect. With advance in age, however, there appears to be—but not with perfect uniformity—a slight prolongation of the disease throughout the entire attack. The number admitted over 50 and 60 years is perhaps too small to warrant any induction. Age does not at any rate afford immunity from the disease. The duration of the second attack is almost two days less than that of the first, at all the various ages. The commencement of the second attack, I may state, was reckoned by the rise in the temperature. From the above tables it will be observed that there is a pretty wide range in the duration of the disease. The first attack may be as long as twelve, and as short as three days; the interval may be as long as twelve and as short as four days; while the second attack may expend itself in two, or be protracted for nine days. On analysing these instances of protracted duration of the first and second attack somewhat more closely, the comparative increase with age of the duration becomes still more apparent. The prolongation would also seem to

be accounted for in some of the cases by the existence of decided jaundice, delirium, bronchitis, or some other complication. In the case among the females of twelve days' duration of the first attack, the woman miscarried, on the 10th—an eight-months' child—and subsequently complained of pain in the left thigh, saying at the same time that she had always felt pain there for about three days after each of her four last confinements. There was no swelling of the limb, however, to be detected. Again, in the three cases of nine days' duration of the second attack, there was in two of them well-marked jaundice and slight delirium, while in the third there was much irregularity in the heart's action, and considerable bronchitis. In some of the cases, however, no other conclusion could be made than that the attack had been a severe one. It is worthy of remark, that in nearly all these cases of protracted duration, the tongue, which as a rule continues pliant and moist throughout the entire attack, became dry and brown in the centre.

As regards the interval it would appear, from the comparative shortest duration, that its prolongation increases considerably with age. It is not, however, always in those cases in which there has been a protracted first attack that we meet with a long interval. The case among the males in which the duration of the interval was twelve days is the one which has been already alluded to, where evidences of non-pyrexial activity existed for five days before any rise in the temperature took place.

The Pulse.—Generally there was great excitement of the circulatory system. Besides great acceleration of the pulse, there was often most distinctly visible pulsation in the suprasternal notch, and in the great vessels of the neck. The averages seen in the tables sufficiently display the great increase of the pulse rate; but it may be added, that in children not unfrequently a pulse of 170 was noted, while in adults it was often found to range between 140 and 160. It would appear from the tables that the pulse attained to a greater height during the second than in the first attack.

The comparison, however, is not an absolutely correct one, for a large number of the cases were considerably advanced in the first attack when admitted, whereas in all the cases the whole course of the second attack was under observation. In the majority of the cases the pulse rate bore a very direct relation to the temperature. With any great remission in the temperature there was almost invariably a corresponding fall in the pulse; while, on the other hand, any exacerbation or re-ascension of the temperature was soon followed by increased rapidity of the pulse. In a few cases, throughout the entire attack, the pulse never rose above 92, even although the temperature had repeatedly been as high as 104°, 105°, and 106°. In character, the pulse was usually full and firm, or bounding, and towards the crisis it often became jerking, thrilling, and undulating. At the crisis, in some cases, the heart's action was most powerfully influenced and disturbed, the pulse became extremely small, rapid, and feeble, at times being quite uncountable, indeed, barely more than perceptible. Again, both before and at the crisis, it was occasionally highly irregular. In these cases, too, the pulse often continued to keep high for some time after the crisis had been fully attained, and the temperature had subsided considerably below the normal. I have already pointed out that at the commencement of the second attack the temperature, as a rule, was for some time elevated before there was any increase in the rate of the pulse. In a number of cases, somewhat before and after the crisis, I took observations every hour of both the pulse and the temperature, so as to determine exactly the hourly rate of fall in each of them, and ascertain which of them gave the first indications of a crisis. The result of these investigations was, that in some cases the temperature fell to a marked extent before the pulse, while, in some others, both the pulse and temperature fell at the same time. The rate of falling was, in all the cases, for the first few hours, much greater in the temperature than in the pulse. In no case did the pulse fall before the temperature. In order to illustrate more fully this interesting inquiry I have tabulated the hourly observations

of two cases, both of them being exeellent examples of their respective terminations.

JOHN MACK., AGED 16.

Crisis of 2nd Attack.

Hour.	Temperature.	Pulse.
12 Noon...	105°.6 ...	152
1 P.M. ...	104° ...	144
2 " ...	101° ...	140
3 " ...	101° ...	132
4 " ...	99°.8 ...	128
5 " ...	97°.6 ...	108
6 " ...	97°.2 ...	102
7 " ...	96°.4 ...	92
8 " ...	95° ...	84
9 " ...	95°.2 ...	84
10 " ...	93°.8 ...	84

AGNES MACC., AGED 40.

Crisis of 2nd Attack.

Hour.	Temperature.	Pulse.
4.15 P.M. ...	107°.2 ...	152
5.15 " ...	105°.2 ...	156
6.15 " ...	103°.2 ...	140
7.15 " ...	103°.2 ...	132
8.15 " ...	100°.6 ...	132
9.15 " ...	99° ...	112
10.15 " ...	97° ...	92
11.15 " ...	96° ...	72

In a number of the cases auseultation of the heart detected a soft blowing murmur accompanying the first sound, and propagated along the vessels of the neek, but simple prolongation of the first sound was mueh more commonly met with.

*The Temperature.**—Of the many symptoms of relapsing fever the eourse of the temperature is one of the most interesting and peeuliar. It is characterised by the rapidity of its rise from the normal, the great height to whieh it attains, the frequent occurrence of sudden remissions, and, above all, by the rapid fall which occurs about the sixth day. When this thermometric course is repeated after an interval of about 7 days, it may really be declared pathognomonic of this disease. At the commeneement of the second attack the temperature often rose 5, or even 6 degrees above the normal in the course of four hours. During the attacks the height attained by the temperature was on an average between 104° and 106°. In many cases, however, it was found to be as high as 107°, while in two eases 108° was noted. In these cases of very high temperature the eondition otherwise was not in any way notably different. In some cases the highest point was reaehed in the first attaek; in others

* I have confined myself to a few general remarks on the temperature, reserving for a future paper a more extended statement of the results of my thermometric observations.

during the second. Again, the highest point generally occurred just at the crisis; but in some cases as high, or even a higher point was attained earlier in the attack. The morning and evening variations were usually about 2°. The lowest point as a rule was reached between 4 and 8 a.m., and the highest between 4 and 8 p.m. Frequently, however, remissions of much greater range were observed. These most generally occurred on the 3d or 4th day. In one case, for example (a lad aged 16), on the morning of the 3d day the temperature fell in the space of eight hours from 105°.6 to 99°.6; in the next two hours it again rose to 103°.6; and in two hours more it was noted as 104°.6. On the 4th day there was another marked remission, the temperature falling in 5 hours from 104°.6 to 99°.2; in one hour it again rose to 101°.2, and in three hours more it was found to be 104°.2. It now continued to ascend, though with occasional slight remissions, till, at the crisis on the 5th day, a temperature of 105°.6 was again registered. In a number of cases the remissions of the temperature actually went below the normal. In one case, on the third day, the temperature fell, in eight hours, from 103° to 96°, it remained subnormal for three hours, and was then noted as 97°.2. In five hours after it was found to be 104°.4, and it subsequently continued to keep high till the crisis on the 5th day, when it was 104°.6. Accompanying these great remissions of temperature there was a corresponding fall in the pulse and respiration, the aspect was more composed, and the patients expressed themselves as feeling much more comfortable. There was also, as at the crisis, copious perspiration. Moreover, these remissions were in many instances preceded by shivering. They were also more common in the second than in the first attack, but here too it must be borne in mind that many of the cases were far advanced in the first attack before they came under observation. The average fall of the temperature at the crisis was from about 9 to 13 degrees, and this usually took place in about as many hours. The greatest fall was 13 degrees, the lowest point reached was 92°.4, but in a man

aged 50, who died from exhaustion after the termination of the first attack, the temperature was found two hours before death to be only 89°.8 in the axilla, and 90°.6 in the rectum. The rate of the fall at the crisis varied somewhat, it was generally most rapid (as in the two cases which have been tabulated) during the first two or three hours; the greatest fall in an hour was 4°, in one case it fell for three hours successively at the rate of 2° each hour. After the critical fall the temperature gradually and slowly ascended to the normal. In a few cases, however, there was a speedy and considerable rebound, the temperature rising again as high as 103°, 104°, or 105°, and then dipping as suddenly again below the normal. With this rebound there was often experienced violent shivering. During these shiverings, as well as in the shiverings which occurred during the attack, there was always found high temperature. During the shivering which often precedes the crisis, the temperature was on several occasions found to be over 107°.

Rash.—In 24 patients, but on 29 separate occasions, a rash was detected. Neither, however, in its time of appearance, duration, or disappearance, nor in its character or colour, nor in its distribution, was any regular and definite course pursued, yet, although generally anomalous, it occasionally exhibited in individual cases some regularity. Thus, in three cases a rash appeared in both the first and second attack; in one case in both the interval and second attack; and in another case, where a third attack was experienced a rash was observed in each of them. It was rather more frequently met with in the first than in the second attack, and again in more males than females. In most of the cases the rash was first observed either on the third day, or just about a day before the crisis. In the former case it generally faded in from 12 to 48 hours, at any rate, before the crisis; in the latter it often disappeared with the crisis. In one case it was detected on the first day of the second illness; in two cases on the second day; and in four cases during the interval about two days after the cessation of the first attack. In these cases, too, its duration was very

brief. In character the rash in some of the cases so closely resembled the typhus mottling as indeed to be quite undistinguishable from it; and in many of them the only difference which could be suggested, after minute and critical inspection, was in the intensity of the colour, the relapsing rash being more vivid and brilliant; but even this varied, as in a few cases the colour was more dull in the relapsing than in the typhus. Sometimes the rash at various parts assumed a uniform erythematous appearance which gradually shaded off into isolated spots. In two cases the rash was in appearance exactly similar to that of measles, but in its distribution it was materially different, the neighbourhood of the joints being the parts chiefly affected, not a vestige of the rash existing on the face, and but very little on the trunk. In another case, on the second day of the relapse, a good many rose-coloured enteric-like papules were observed on the abdomen and thorax, but on the 5th day they had all disappeared, the crisis not occurring till the 6th day. The distribution of the rash varied considerably; in some of the cases it was solely confined to the trunk; in others to the arms and legs; but in most it was somewhat general. In a number of them it was in very much greater abundance in the vicinity of the joints; it was never observed on the face. In some of the cases there was subsequent desquamation.

Delirium was very rarely observed. The contrast between a typhus and a relapsing ward in this respect was usually very striking. Under the head delirium in the tables every case was enumerated where the least wandering occurred. In reality, however, out of the 352 cases, decided delirium was only met with in seven, viz., six men, and one woman. In all the other cases there existed merely slight wandering and incoherent talkativeness, with occasional attempts to rise from the bed and walk away, in consequence generally of the mind being occupied with some delusion or hallucination. Such phenomena generally appeared shortly before the crisis, or very soon thereafter. When the patients were spoken to or remonstrated with they immediately replied

with their customary intelligence, and at once explained the reason of their absurd behaviour. One young man made the somewhat amusing and unprecedented request of the nurse that she would put the restraining sheet over him, as he felt he was wandering a good deal. Of the six highly delirious men, only two could be pronounced as cases of pure uncomplicated delirium; the other four were habitual drunkards. The frequent association of great delirium in relapsing fever, with habitual drunkenness, has been clearly demonstrated. In these cases of high delirium the patients were often at the same time most remarkably self-conscious and methodical in their procedures; and on this account their vagaries were even more provoking and annoying to the attendant than were those of the muddled and unreasoning typhus patient. Restraining sheets, and even strait-jackets, were almost totally useless. In the two uncomplicated cases the delirium began shortly before the crisis, and ceased soon after the termination of the attack. In the other cases, however, it continued for a much longer period. In one case it existed during the entire interval, became aggravated during the second attack, and after its termination persisted for at least a fortnight. In this case, I may add, there was also intense anæmia besides the element of habitual drunkenness. In the case of the woman referred to above, the delirium was complicated with hysteria.

Jaundice.—In 30 cases, but on 35 separate occasions, there was evident yellowness of the skin and conjunctivæ, but in only seven of these, was the jaundice well marked and intense. It was generally observed either about two days before or just at the crisis, and very soon thereafter entirely disappeared. In three of the intensely jaundiced cases it remained decidedly present throughout the interval, and again greatly increased during the second attack. When the jaundice was well marked the stools were usually of a light yellow colour, but occasionally they were almost white. The urine presented the ordinary bilious appearance. Hepatic tenderness and enlargement were not, however, more frequently observed in these cases than in those where not

the slightest appearance of jaundice was deteetcd. In only one case was the hepatie dulness greatly inereased. All of the severcly jaundieed eases pursued in every way the ordinary eourse of the fcver, except that the duration of the disease was somewhat prolonged.

Muscular and Arthritic Pains.—These occurred so very frequently that they imparted quite a rheumatie aspect to the fever. They were often so severe and ineessant as to render the patient miserable and helpless. Thcy existed during both of the attacks, but, as a rule, they were more severe after the erisis, espeeially after that of the second attack. Movement either active or passive, as also pressure, greatly aggravated these pains, but on no occasion was there any swelling or redness observed in conneetion with them. The situations of the pains were vcry various, sometimes they wcre felt in every part of the body, or as one patient exprcssed it—"Every bit of me is sore, even the tips of my fingers." In a number of eases the nape of the neek was the part affeeted. In one ease the most intense pain was experieneed for two days after the erisis, just at thc right malar bone, and extending somewhat along the zygomatic proeess. During its existcnce the patient refused all solid food, as whencver the least movement of the jaw was made the pain beeame quite exeruciating. Generally, however, the pains ehiefly affeeted the large joints and the museles of the baek and limbs. Often the seat of pain varied in the same individual, at one time all the joints were implieated, at another only the shoulders or knees: or, again, only the thighs, ealves, &c. In a few eases very severe "jagging or stinging pains" wcre felt in the soles of the feet. In one ease thc patient was tormented with such pains for at least three wccks after his second illness, any attempt to walk being at once abandoned on aecount of thc intensity of the pains. In the majority of the eases, however, thesc muscular and arthritic pains did not continue for morc than two or threc days after the crisis.

Third Attack.—Of the 352 cases three men and one woman

were seized with a third attack, or seeond relapse. In these cases the average duration of the seeond interval was 6·92 days, its longest duration 11 days, and its shortest 4 days. The average duration of the third attack, or seeond relapse, was 5·25 days: its longest duration was 8 days, and its shortest 2 days. The fever during the third attaek in eaeh of these cases was comparatively rather less severe; otherwise the only peeuliarities in the cases were that in onc, a boy aged 12, in whom a rash had been observed in eaeh of the two previous attacks; there again appeared on the second day of the third attack a rash which consisted of isolated typhus-like spots, sparsely distributed over the thorax, abdomen, and back. About two days thereafter the rash entirely disappeared, but the crisis did not occur till the 8th day. Again, in the case of the woman who had a third attack, she miscarried with a 6-months' dead child, two days after the termination of the second attack; and three days before the onset of the third. Up to this time (April 1871,) no patient has been seized with a fourth attaek, or third relapse.

Hæmorrhages.—Epistaxis occurred in 20 cases—in seven of these it was deeidedly eopious; but in two of them it was so very profuse as to necessitate plugging of the anterior nares. In one ease it oeeurred during the first attack, the interval, and the seeond attaek; and in another case in both the first and second attaek. In most of the eases it eommenced just about a day or so before the erisis; but in some cases it was only seen during the interval, or subsequent to the second attack. *Menorrhagia* was met with in four eases. One of them, a woman aged 45, affirmed that she had eeased to menstruate eight months ago; but soon after the erisis of the first attaek there was for upwards of two days very profuse metrorrhagia. *Melæna* was not seen in any of the 352 eases; but I may add that it has since been observed in two cases, and in these it occurred during both attacks.

Abortions.—Five of the women were pregnant, and all these aborted. In two of the eases the abortion or miscarriage happened during the first attack, just a little before the crisis. In other two eases it took place about a day

after the termination of the first attack; and in the other case it occurred at a similar period after the second attack. The abortions occurred at 8, 7, 6, 4, and 3 months. The children born at 8 and 7 months lived for several hours. All the pregnant women since admitted to the hospital with relapsing fever have either aborted or miscarried. In a few cases it almost seemed as if no such event would take place, as the patients were far advanced in their convalescence (one was indeed on the eve of being dismissed), before the abortion or miscarriage occurred. In such cases the child was always dead.

No Second Attack.—In 4 males and 11 females there was no second attack. As has been already remarked those cases only have been enumerated under this heading which not only presented all the usual symptoms of relapsing fever during their first and only illness, but in which there was also the most distinct history of previous association with characteristic cases of that fever at the same time in the hospital. The average duration of the fever in these cases was 6·4 days; in eight of them the fever pursued a decidedly severe course, and in two of them it continued as long as 9 days. Curiously enough, in 7 of these 15 cases, about the time, when, in a normal case the relapse is due (14th day on an average), symptoms as of an approaching second seizure were exhibited; the tongue became furred, and the aspect dull, while headache, backache, anorexia, vomiting, splenic pain, and a feeling of general malaise, were experienced. These symptoms did not usually continue for more than two days. All the while there was not the least rise in either the temperature or the pulse.

Spleen.—In almost every case where the spleen was examined during the attack it was found to be considerably enlarged. Generally it somewhat diminished during the interval, and again increased during the second attack. In some of the cases the most excruciating pain was at times experienced in the splenic region. Such pain usually occurred just about the crisis, and more frequently in the second than in the first attack. Sometimes, however, it was met with

subsequent to the attaeks. In all these eases the spleen was found to be greatly enlarged; in one case, a man aged 26, the most agonising splenie pain was experieneed shortly beforc the erisis of the second attaek. It eontinued to inerease up till the erisis, and was intenscly aggravated by pressure, breathing, or eoughing. When the spleen was then examined the dulness was found to be upwards of five ineches in length, and three ineches in breadth. The crisis was usherced in by a most severe and prolonged rigor, which was followed by very profuse sweating. As soon as the sweating began, the splenie pain rapidly became less intense, and in eight hours thercafter it was entirely gonc. The spleen was again examined, about twelve hours after the erisis, and the dulness was then found to have deereased at least an inch in length, and half an inch in breadth. Its subscquent diminution was, howevcr, mueh more gradual.

The Tongue.—Not the least remarkable featurc of relapsing fever was the eondition of the tongue. In by far the great majority of the eascs it remained perfcctly pliant and moist throughout the whole illness, evcn when the tempcrature was as high as 107° and 108°. The fur varied in amount, but generally eonsisted of a white or yellow coating. Oftcn there was marked prominence of the papillæ, and frequently the edges and tip were quite elean. In some eases thc tip, or central strip, became dry and brown, the edges still presenting a moist white or yellow coating. In hardly any ease was there observed the uniformly dry baked tongue whieh is so often seen in typhus. In only three cascs was thcre any sordes deteeted.

The Urine was examined for albumen only. In a large proportion of the cases in which the urine was regularly so tested, distinet traees of albumen were found. In a number of the cases where there was marked œdema of the limbs during convaleseence, thc urine was earefully examined, but no albumen was detected.

Complications.—Thesc were but few in number, and were not of great importance. They are eomprised in the following:—Urticaria in two cases; pneumonia in one case; herpes

labialis in four cases; painful swelling and induration of the cervical and axillary glands in one case. In upwards of 20 eases slight diarrhœa occurred either during the attack or at the crisis. In a few cases there was slight conjunctivitis, and occasionally photophobia.

Sequelæ.—These likewise were far from numerous. Œdema of the lower limbs at times very considerable, and manifestly the result of debility and intense anæmia, oceurred in a large proportion of the eases. In two cases there was very considerable parotid swelling; in one of them, a woman upwards of 70 years of age, it first appeared about 11 days after the eessation of the second attack, and finally suppurated. In the other, a woman aged 30, it was first complained of and observed about three weeks after the termination of the relapse, and finally disappeared without suppurating. In no case was post-febrile ophthalmia observed. The patients were not suffieiently long under observation to permit of the display of this sequela, which usually is not met with earlier than six weeks after convalescence. In two cases the sequelæ were of a somewhat interesting and peculiar nature. One, a man aged 45, was found six days after the crisis of the second attack to be affected with paraplegia. Subsequently there was much constitutional derangement, and he died about three weeks thereafter. *Post-mortem* examination revealed most extensive and decidedly old grey degeneration of the spinal cord. The paraplegia in this case, therefore, was not a pure result of relapsing fever. The other case was that of a man aged 44, who was found six days after the termination of the seeond attack to be affeeted with paralysis of the facial nerve, on the right side; the mouth was drawn to the left, and the right eyelids could not be closed; but the tongue was protruded almost exactly in the median line, and the uvula was not in any way displaeed. Sensation was not at all impaired. Two days later the mouth was even more drawn to the left side, there was much greater flaeeidity of the eheek, and the tongue was also very markedly protruded to the left side; sensation too was somewhat diminished. The follow-

ing morning he became suddenly slightly faint, but there was no insensibility. Nothing further occurred, but the eondition deseribed abovc eontinucd with little or no change, and when three weeks after its first appearanee the patient, who all along had been somcwhat unruly, insisted on leaving the hospital, the paralysis eould not be said to be in any way improvcd.

Deaths.—Of thc 352 cases six died, thc mortality thus being 1·7 per eent. The mode of dying in relapsing fever, as exhibited in thcse eases, and, I may also add, in nearly all the deaths observed subsequently, was very uniform. In its nature it is one the full apprehension of which is of the highest importance, both as a guide to the trcatment and an aid to the prognosis. In the brief general deseription already givcn of rclapsing fever refercnce was specially made to the profound condition of eollapse, associatcd with extreme feebleness, or great irregularity of the heart's aetion, whieh somctimes oeeurred towards or after the crisis. Almost invariably death resulted from a deepening and aggravation of the eondition then described, in short, from syneope, or total failure of thc aetion of the hcart. Of the six deaths two werc of a somewhat cxeeptional eharaeter. One was the man, already referrcd to, who beeame affected with paraplegia; the other was a ehild, agcd 9 months, who was seized with severe convulsions, just about the erisis of the seeond attack. The eonvulsions reeurred, and the child died in two days. The other four eases were, howevcr, typieal examples of thc mode of dying mentioned above. In one, a man aged 50, who, on admission, was five days ill, and seemed just then to have attained the erisis, the pulse was found the day after to be highly irregular and very feeble, the eyes retraeted, the features sunken and pinehed, and the whole aspeet pale and sallow. There was also very persistent retehing and hiccough. These symptoms steadily beeame worse, and the paticnt died next day, his intelligenee being preserved almost to the very last. The tempcrature was taken about two hours before death in the axilla and rectum. In the axilla it was found to be

only 89°·8, and in the rectum 90°·6. In another case, that of a woman aged 35, on the 4th morning of the second attack, just at the crisis, the pulse was found to be 136, extremely feeble, and the whole aspect indicative of great collapse. There was also very severe and persistent retching and vomiting. Throughout the day there was considerable perspiration, and in the evening the pulse was noted as 124, though still very feeble, and the temperature in the rectum was 99°·2. On the morning of the 5th her condition was markedly worse, the appearances of collapse were greatly increased, the pulse was 132, but almost too feeble to be counted; the temperature in the rectum was found to be 103°·6. At 6 p.m. the rectum temperature was found to be 107°; at 8·30 p.m. she died. Regarding these four deaths there is yet another fact worthy of remark, viz., that in three of them there existed chronic diseased states, which of themselves might cause death. One, a woman aged 47, had mitral obstruction; another, the man, aged 50, was found, on *post-mortem* examination, to have marked cystic degeneration of both kidneys; while in a third, an old man aged 70, there was considerable bronchitis. It would thus appear that relapsing fever very rarely proves fatal to healthy persons. Subsequent experience was fully confirmatory of this conclusion.

Post-mortem Appearances.—In the three cases just alluded to an examination was made. In one of them the spleen weighed $9\frac{3}{4}$ oz., and presented on its outer surface a fluctuating swelling, bounded by harder tissue, and of about the size of a walnut. On section about an ounce of sanious fluid escaped. The capsule was blackened, and immediately beneath it the substance of the spleen was disorganized and pultaceous. The tumour was sharply bounded, irregular in outline, and presented on section a ridge elevated above the other parts of the spleen. On the capsule there was a layer of tissue, easily separable, pale in colour, and evidently the same as the tissue forming the ridge described. In two other places there was detected a similar condition, but on a much smaller scale. Other abnormal conditions were

found, such as cystic degeneration of the kidneys, mitral obstruction, &c., but nothing was otherwise detected which could in any way be said to be the result of the febrile process.

Treatment.—In none of the cases was any attempt made by the administration of quinine or other remedy to diminish the duration of the fever, or prevent a relapse. Such attempts having failed in the hands of others at home and abroad, there seemed to be no sufficient reason for repeating the experiments. The medicinal treatment thus consisted purely in efforts to palliate and relieve symptoms, and more particularly to obviate the very first manifestations of disturbed and enfeebled action of the heart, which so frequently accompanies collapse.

Sleeplessness was generally overcome by the exhibition of either chloral or opium; but in order to produce this effect it was necessary that the dose of either of them should be a large one. Of the former about 40 grs., and of the latter about 2 grs., were usually required. In two cases a very striking effect was produced by the successive administration of these two agents. In one of them, a man aged 21, 10 drops of liquor opii sed., (Battley), with 20 drops of spiritus chloroformi were given, on three separate occasions, throughout the course of the day, the last dose being about 8.30 p.m. When the patient was again seen, at 11 p.m., he was still found to be as sleepless and restless as ever; 40 grs. of chloral were now administered. About 5 o'clock the following morning I was called to see him, the nurse saying that she thought John C. was dying. I found him in a profoundly comatose condition. Touching the conjunctiva induced no reflex action; the pupils were greatly contracted, merely pinholes; the mouth was widely open; and the breathing very slow and gasping. The pulse was almost imperceptible. Faradization was at once resorted to, and after it had been persevered in for some time, the patient was at last fully aroused. In the other case—a man aged 42—40 grs. of chloral were given at 1 p.m., and again at 3 p.m. No effect was, however, produced, and at 4.30 p.m. 10 drops of liquor

opii sed., (Battley) with 20 drops of spiritus chloroformi, were administered. At the evening visit, about 7 p.m., the patient was noted as being "asleep since 5 p.m." At 9.30 p.m. Dr Leckie, who was then summoned, found him in a condition almost exactly resembling that above described, but the coma was rather less profound.

The incessant retching and vomiting, with at times obstinate hiccough, were most effectually relieved by the administration, when admissible, of somewhat large doses of hydrocyanic acid—usually about 5 drops of the acid of the B. P. When, however, the retching and vomiting existed at the crisis, and were associated with great feebleness of the pulse and tendency to collapse, the best results were obtained, in a number of cases, by the administration of powdered opium and subnitrate of bismuth, and at the same time directing that nothing whatever but the powders should be given by the mouth, the patient's strength being for a time wholly sustained by nutritive and stimulant enemata.

As might be expected from the way in which the action of the heart becomes disturbed and impaired in relapsing fever, alcoholic stimulants were of the utmost remedial value, and were always excellently borne. In the large proportion of the cases where their administration was demanded, their use was only required for a day or two before and after the crisis, but in a considerable number their liberal administration was necessary for a much longer time. In consideration, too, of the tendency to syncope, the recumbent position was in severe cases strictly enjoined for some time both before and after the crisis.

With the view of relieving the muscular and arthritic pains, iodide of potassium, acetate of potash, and wine of colchicum, were prescribed in several cases, but the severity or duration of the pains could not be said to be in any way influenced thereby.

During convalescence tincture of steel was administered in almost all cases, a practice suggested by the obvious anæmia which prevails long after an attack of this fever.

The points which it is of importance for the practitioner to remember in attending cases of relapsing fever may be very shortly summed up. During the continuance of the febrile process there is little danger and little to be done. The cerebral and pulmonary complications which demand strict observation at this period in typhus, are either not seen in relapsing fever, or are so mild as to require no special attention. The period of crisis and of collapse, in which the febrile process suddenly terminates, is that in which the dangers threatening life are found, and during which the patient requires minute attention. With this care and attention there is no disease which reduces life to such a low ebb and yet leaves a certainty of recovery, while without it there is no disease in which so suddenly life may be exposed to extreme peril, and may be lost so easily. The tendency to death is by syncope, and it is probably thus that most fatal cases of relapsing fever terminate. The remedy is alcohol, best in the shape of brandy, given freely, and along therewith such concentrated fluid food (milk, Liebig's extract, &c.) as the stomach will retain. Short and sharp are the adjectives which characterise stimulation in this condition. It may be only for six hours, or it may be for two or three days. The pulse must be watched, and the length and strength of the stimulation be regulated accordingly. Equally important during this period is the preservation of the recumbent position. On no account whatever ought the patient to sit up, still less to get out of bed. To ensure this the nurse must be warned not merely against helping the patient out of bed, which is sufficient in the case of typhus, but also to *prevent the patient from rising.* The muscular strength is not reduced as in typhus; the intellect is clear; and although in aspect and in vital condition as like a corpse as a living person could be, the patient will take every opportunity of rising to stool, &c., in spite of warnings, and may fall back on the bed dead, or with a heart "foundered," in a condition from which recovery is impossible.

Table No. 1.—Males.

Age.	Total Number Admitted.	1st Attack.						Muscular and Arthritic Pains.	Interval.			Muscular and Arthritic Pains.	2nd Attack.						Muscular and Arthritic Pains.	Third Attack.	Epistaxis.	Stimulated.	Died.	No Second Attack.
		Average Duration in Days.	Average Pulse Maximum.	Average Pulse Minimum.	Rash.	Delirium.	Jaundice.		Average Duration in Days.	Rash.	Delirium.		Average Duration in Days.	Average Pulse Maximum.	Average Pulse Minimum.	Rash.	Delirium.	Jaundice.						
0–9	16	6·28	144	114	2	...	...	2	6·84	...	...	...	4·30	148	110	1	...	...	4	...	2	...	...	...
10–19	63	7	128	110	5	8	2	25	7·24	2	1	17	4·50	132	102	4	6	2	44	3	4	3	...	...
20–29	32	6·70	128	110	1	8	1	14	7·86	...	...	9	4·68	128	96	1	3	3	25	...	1	1	...	2
30–39	19	6·66	118	108	...	...	1	9	7·86	...	...	8	5·05	130	98	...	2	1	14	...	1	2	...	1
40–49	19	7·08	124	108	...	4	2	9	8	1	...	3	5·10	128	94	...	2	6	13	...	2	3	1	...
50–59	7	7·50	118	102	...	...	1	3	9	...	...	3	5·80	128	96	...	...	2	2	...	...	1	1	1
60	6	7·16	118	100	...	1	2	2	8	...	...	1	5·50	126	94	...	2	1	2	...	...	2	1	...
All ages.	162	6·91	125	107	8	21	9	64	7·82	3	1	41	4·99	131	98	6	15	15	104	3	10	12	3	4

Table No. 2.—Females.

0–9	23	6·20	138	118	...	...	...	4	7·28	...	...	4	4·28	142	110	...	2	...	7	...	2	2	1	...
10–19	69	6·44	134	114	5	3	...	23	7·76	1	...	18	4·66	134	104	2	1	...	35	...	1	14	...	5
20–29	38	6·58	124	114	1	1	3	14	7·70	...	...	14	4·70	134	102	1	2	...	23	...	3	10	...	2
30–39	29	7·52	124	110	1	3	4	11	7·80	...	..	14	5·20	142	102	...	2	...	15	1	3	14	1	2
40–49	20	7·	128	98	...	2	2	9	7·50	...	1	6	5·94	138	98	...	2	1	12	...	...	10	1	1
50–59	7	7·	126	114	...	1	1	1	10·	...	...	1	6·16	136	108	...	1	...	1	...	...	4	...	1
60	4	7·	120	104	...	...	...	1	10·	...	...	2	5·50	130	104	...	1	...	2	...	...	4	...	...
All Ages	190	6·82	127	110	7	10	10	63	8·29	1	1	59	5·20	136	104	3	11	1	95	1	9	58	3	11